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**National Park Service**  
**U.S. Department of the Interior**

**Big South Fork National River and Recreation Area**  
**Oneida, Tennessee**

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# **Fields Management Plan**

**March 2006**

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**National Park Service**  
**Big South Fork National River and Recreation Area**  
**Kentucky and Tennessee**

## **1.0 INTRODUCTION**

### **1.1 Purpose**

Big South Fork National River and Recreation Area (National Area) contains 102 fields units, totaling approximately 740 acres in area. Although this represents a very small part (less than one percent) of the National Area, fields are important components of its natural and cultural landscape. Fields and natural open areas are distinct in character and use from those of the surrounding forest. However, in their current condition, many fields are not beneficial to wildlife or native plants and are not fulfilling visitors' needs or expectations. The National Area is committed to engaging in a long-term field management strategy that perpetuates natural communities, preserves cultural resources, and enriches recreational opportunities.

The actions proposed in this plan represent what National Area managers believe to be a balanced approach to accommodating multiple values in a way that is consistent with the objectives outlined in the National Area's General Management Plan (2005). Other alternatives considered included allowing a majority of fields to return to forest or managing all existing fields as regularly maintained fescue fields. Neither of these alternatives would have successfully met the needs of visitors or provided the desired benefit to wildlife, native plants, or cultural resources. The environmental consequences of each alternative are analyzed in detail in the appended Environmental Assessment.

### **1.2 Background**

Forest vegetation dominates the Big South Fork landscape. In contrast, open areas constitute a minor part of the National Area. Evidence suggests that natural wet meadows, open pine-oak woodlands, and sandstone glades were previously more extensive on the Cumberland Plateau. Fire suppression and agricultural development are often cited as causes of decline of these natural open habitat types. Old fields, although not natural features, have helped support open-habitat plants and wildlife as natural openings have declined. However, the National Area's fields are also rapidly changing. Fields that were regularly plowed, grazed, or harvested prior to establishment of the National Area are no longer being actively managed. Active management, such as bush-hogging or burning, is required to maintain the fields in an open and treeless condition. Without these management activities, woody plants are colonizing old fields. Over time, these fields will become overgrown with shrubs and trees and ultimately become forests. This process, although natural, is at some sites inconsistent with other National Area objectives and mandates, including protection of certain wildlife, rare plants, and cultural landscapes.

Encroaching woody vegetation also threatens to change the character and diminish the historical accuracy of remaining homesteads and other cultural landscapes. Ten field units are components of officially designated cultural landscapes in the National Area. National Park Service policies require that the National Area maintains the integrity and character of official cultural landscapes by stopping or slowing deterioration caused by natural forces and normal use. These guidelines pertain to open fields as well as buildings and other structures. Therefore, maintenance of official cultural landscapes should involve control of encroaching woody vegetation in specially designated fields.

Another serious problem with the National Area's existing fields is the presence of exotic plant species. Many of the plants growing in the National Area's fields are of European or Asian origin. Others are cultivated non-native species that were planted for livestock forage. Common

examples of non-native field plants are tall fescue (e.g., Kentucky-31), Chinese lespedeza, Johnson grass, Queen Anne's lace, ox-eye daisy, dandelion, yellow rocket, field bindweed, bittersweet nightshade, red clover, timothy, common teasel, and common cocklebur. Exotic invasive shrubs, although not abundant in all fields, commonly include multiflora rose, privet, and autumn olive. Invasive tree species, such as tree-of-heaven, have quickly gained a foothold in some old fields. Fields, roads, trails, and other disturbed areas are often source areas for exotic plants. From these sites, exotic plants can migrate into previously stable communities where they displace native plants and reduce wildlife habitat.

Non-native tall fescue dominates most of the National Area's fields. Fescue-dominated fields do not share the same physical characteristics as native-grass meadows and typically do not satisfy the biological needs of desirable plants and animals. For example, fescue tends to form a tight sod that restricts the tunneling and burrowing habits of small mammals and birds. Fescue does not provide overhead protection from avian predators, space for catching insects, bare ground for finding seeds, or sites for nesting. Fescue is also host to a toxic fungus that can affect the health and reproductive success of some wildlife.

Although most of the fields units addressed by this plan do not provide habitat for rare plants or animals, the proposed actions may improve habitat attributes and restore processes that are important for rare species. Many state-listed plants occurring in the Big South Fork region, some more common only decades ago, are rare today because of the absence of fire (Campbell et al. 1990a). Species that are typical of open, fire-maintained, oak-pine woodlands with grassy understories are increasingly rare in the National Area (Campbell 2001). This includes two federally listed species, both extirpated from the region: American chaffseed (*Schwalbea americana*) and red-cockaded woodpecker (*Picoides borealis*). The federally endangered chaffseed, for example, is a species that exists on sandstone knobs and inland plains where frequent, naturally occurring or human-caused fires maintained these sub-climax communities (U.S. Fish and Wildlife Service 1995). There were several historical collections of the plant in Tennessee and Kentucky, including a 1935 collection by Braun from a "sandstone knob" along the Alum Creek Road (KY 700) in the vicinity of the National Area (Campbell 1990b). Repeated searches for this species have been unsuccessful. As recently as the mid -1980's, several colonies of the fire adapted, federally endangered Red-cockaded Woodpecker were found within a twenty-mile radius of the park, with some colonies in the immediate vicinity (USDA Forest Service 1995). In 1994, five known active clusters were located on the Daniel Boone National Forest that adjoins the National Area (Costa and Walker 1995). None of these clusters remain.

Fire-maintained grassland or grassy-woodland communities with relatively high diversity of native species, once more common in size and extent, are now restricted to a few patches along old backcountry road margins, and will soon be extirpated (Campbell et al. 1990a). The loss of the native barrens vegetation has had an adverse impact on grassland birds and other species that depend on this type of habitat (Campbell et al 1990a, Stedman and Stedman 2002). The restoration of native warm-season grasses and open grassy woodlands may provide additional habitat for these species.

## **2.0. MANAGEMENT ALTERNATIVES**

The current Plan proposes actions intended to increase the value of formerly disturbed open lands. By actively or passively restoring a many of these disturbed areas, this Plan increases diversity of vegetation structure and species composition within the Big South Fork landscape. The Plan increases the value of these areas for wildlife, including game species. The

Plan helps restore the original character of the National Area's Cultural Landscapes; therefore, allowing for more accurate interpretation of these sites. Lastly, the Plan enhances the recreational opportunities associated with open habitats, such as hunting and camping. The starting point for achieving these objectives is in identifying a Desired Condition for each field unit in the National Area and assigning a treatment prescription that allows us to manage for that condition.

## 2.1 Desired Resource Conditions

The National Area's Final General Management Plan (GMP) sets the baseline for desired resource conditions within delineated management zones. A majority of the National Area's field units fall within the Natural Environment Recreation Zone:

*Natural processes would be protected within this unit, and a predominantly natural condition would be readily apparent to the visitor. Natural succession into mature forest would generally be the resource objective, although some areas may be managed to promote certain vegetation types, such as native grasses.*

A handful of field units are identified in the GMP as Cultural Spaces, which are included in the Sensitive Resource Protection Zone:

*Natural elements and processes cause changes in or deterioration of human-caused features. Fields grow up in forest and structures weather and rot away. Except where decisions are made based on certain criteria to preserve, rehabilitate, or restore these sites, the toll of natural processes would be accepted after appropriate documentation.*

Additional field units are contained in First- or Second-order Development and Visitor Use Zones:

*These units would essentially be designed landscapes planned in harmony with their surrounding natural communities. Native vegetation would occur as backdrop, screening, and facility landscaping.*

Additionally, we have expanded on the resource conditions identified in the GMP by specifically identifying a desired vegetation condition for each of the National Area's fields. We identified five desired vegetation conditions: (1) native warm-season grasses, (2) tall fescue mix, (3) turfgrass, (4) grassy woodland, and (5) forest. A single 3-acre field unit within a cultural landscape will also be planted in sorghum as part of an interpretive program. Table 1 presents the acreage and number of units targeted for each condition category. Figures 1-6 show the mapped location, approximate field boundaries, and desired condition of each field unit as well as other natural, cultural, and administrative features of the National Area.

**Table 1. Proposed number of field units and acreage of each desired condition for fields at Big South Fork NRR.**

<b>Field Condition</b>	<b>Acres</b>	<b>Units</b>
Native warm-season grass	309	32
Tall fescue mix	101	12
Turfgrass	66	10
Grassy woodland	125	16
Forest	141	31

### ***2.1.1 Native warm-season grasses***

In these units, non-native grasses and forbs would be replaced with native warm-season grasses (NWSG) and native forbs. Major native grassy components of NWSG meadows could include little bluestem, broom sedge, big bluestem, Indian grass, purpletop, poverty grass, assorted panic grasses, rushes, and sedges. The exact mixture will depend largely on soil moisture, acidity, and frequency of fire. Native forbs may include asters, goldenrods, blazing stars, joe-pye weeds, thoroughworts, lespedezas, buttercups, milkweeds, fleabanes, ironweeds, lobelias, mountain mints, St. John's-worts, thistles, tick trefoils, violets, and many others. NWSG units would require periodic fire or a mixed-fire and mowing regime in order to avoid woody plant encroachment.

Many field units would require treatment for exotic plants. Some exotic plants, such as Chinese lespedeza, are encouraged by fire and should be eradicated with herbicides before fire is introduced. Treating multiflora rose, autumn olive, tree-of-heaven, white poplar, and other exotic woody plants before burning will also reduce the likelihood of post-fire regeneration of those species.

Natural seed dispersal of local native grasses and forbs is preferred for establishment of NWSG meadows. If natural seeding is insufficient, local seeds could be collected and planted in seed plots for use in NWSG meadow establishment. Indian grass and big bluestem seed-source plots already exist within the National Area; however, not in sufficient quantity to plant large field units. Seeds may be purchased if the seed source meets NPS guidelines for maintaining local genotypes.

Replacing fescue-dominated fields with native-grass meadows would contribute to species and habitat diversity. Exotic plant species would be present but not abundant. This community type is consistent with other values, such as hunting, wildlife viewing, and aesthetics. Generally, costs associated with maintaining native-grass meadows are low compared to the frequent bush-hogging and exotic species control required for maintaining fescue-dominated fields.

These grasslands would be managed to include patches of shrub-scrub vegetation nested within the grass matrix. Shrub-scrub describes a mostly treeless habitat type where shrubs are the predominant vegetation cover. Although this habitat currently exists in the Natural Area, many of the shrubs are exotic species (e.g., autumn olive and multiflora rose). The desired habitat would instead include native shrubs, sub-trees, and tree saplings: New Jersey tea, redbud,

flowering dogwood, American hazelnut, hawthorns, persimmon, southern crab apple, wild plum, black cherry, post oak, sumacs, Carolina rose, blackberries, sassafras, coralberry, and others. Maintenance of these patches would be required periodically. Maintenance would involve periodic exotic plant control using herbicides and mechanical clearing exclusively or in tandem with prescribed fire at an appropriate interval and intensity to prevent succession to forest.

### ***2.1.2 Turf grass***

These units are planted with lawn grasses and regularly mowed for a manicured appearance. Turf-grass zones appear in developed areas, such as the Headquarters complex and Bandy Creek Visitor Center facilities. These sites are maintained for aesthetic and recreation values.

### ***2.1.3 Tall fescue mix***

Within cultural spaces and administrative-use areas in which succession to forest is not desirable, low grassy vegetation, typically dominated by fescue, may be maintained. Regular bush-hogging would be used to maintain a low-growth condition.

In a few field units designated to support the NPS or concessionaire horse program, cool-season grass pasture is currently established and will be maintained as such. Dominant vegetation includes fescue, orchard grass, timothy, and other pasture grasses.

### ***2.1.4 Grassy woodland***

Grassy woodlands are characterized by a scattered or scattered-patchy distribution of dominant trees over a grassy understory. Shortleaf pine will be the major tree component of grassy woodlands. Often, oaks are secondary components, although in some cases may exhibit greater dominance than pine. Dominant oak species may include post oak, blackjack oak, scarlet oak, black oak, southern red oak, white oak, and chestnut oak. Allegheny chinkapin, black huckleberry, box huckleberry, farkleberry, and mountain laurel are among the shrubs that may be present in varying abundance depending on the frequency and intensity of fire.

The fire practices of Native Americans and early settlers may have maintained pine-oak woodlands through frequent understory burns. The appropriate fire regime for restoring this system is not well documented; therefore, we would adopt an adaptive management approach until we identified a successful strategy. A high fire frequency (1-6 yrs) is necessary to reduce hardwood competition and maintain an open grassy understory. We would begin field conversion by using prescribed fire at a three-year interval to help eliminate fescue and other exotic plant species. Herbicide applications may be used to facilitate fescue removal, if necessary. We would rely on natural seeding of shortleaf pine or oak seedlings. Subsequently, we would burn at the appropriate interval to maintain the desired overstory structure and grassy understory.

### ***2.1.5 Forest***

Existing field units that are designated to return to a forested condition would be treated for invasive exotic plant species; otherwise, these fields would not be actively managed. In the absence of disturbance, these fields would eventually return to forest. Virginia and shortleaf pine would continue to invade most dry fields. Moist fields are frequently invaded by sweetgum and

yellow-poplar. Ultimately oak-pine or mixed-hardwood forest types would replace the early successional vegetation. Exotic species are generally present at lower abundance in mature forests than in early successional communities. Mature forest is consistent with many other values such as recreation and aesthetics. Local forest fragmentation would be reduced, supporting wildlife that requires large blocks of contiguous forest canopy. Once established, there is no maintenance required to support this vegetation type, although periodic prescribed fire could play a role in affecting species composition and managing hazard fuels.

## **2.2 Other Designations**

### **2.2.1 Cultural Landscapes**

Ten field units are part of designated Cultural Landscapes (#5.1, 5.2, 51.1, 51.2, 54.1, 54.2, 55, 63, 64, 65). NPS policies require that Cultural Landscapes be maintained to resemble their original character and that deterioration be arrested to the extent possible. Cultural Landscape Inventories of existing conditions have been completed at four of the National Area's Cultural Landscapes. These inventories provide a baseline that guides the direction of management actions intended to restore the landscapes to a desired condition. The National Area's Cultural Resource Specialist, in cooperation with the State Historical Preservation Offices and other interested parties, will ultimately use the inventories and other available information to determine the boundaries and targeted condition of each landscape. Inventories still need to be completed at additional landscapes in the National Area. Until inventories are completed and target conditions identified, NPS will maintain the existing boundaries of any field area within a Cultural Landscape, as identified by the mature tree line. Encroaching woody vegetation within each field boundary will be controlled through mechanical, chemical, or fire treatments. Legacy vegetation, such as apple and walnut trees, will be preserved.

### **2.2.2 Special-use Events**

Groups of more than 30 people seeking to camp or hold special events in a field must apply for a special-use permit. Currently, only Appaloosa Field South (#52.1) and Appaloosa Field North A (#52.2) are designated for use by large group gatherings. Should demand warrant it, the existing perimeter of Appaloosa Field North A could be increased to its historic boundary, thereby, increasing the site's capacity. The GMP includes these field units in the Bandy Creek First Order Development Zone and allows for the construction of a picnic shelter. Should there be a future need for additional fields to support special-use events, National Area managers, at their discretion, may designate other fields.

## **2.3 Kinds/Level of Visitor Use**

The GMP sets the baseline for allowable kinds and levels of visitor use within delineated management zones. For field units within the Natural Environment Recreation Zone, the GMP specifies:

*Trail uses would predominate. Camping by backpack or packhorse would be available. Hunting would occur in season outside of safety zones. Use levels would be higher near developed sites and trailheads. Once away from points of congregation, use levels would naturally be lower and even more so in remote areas.*

For field units included in the Sensitive Resource Protection Zone:

*Depending on the resource, its location, and appropriateness to make it available to visitors, visitor use could range from high to none. Use may only be viewing the resource from a distance, either near or far. It could also be walking through a sensitive area on a clearly marked trail or a boardwalk marked with appropriate guidance. Horseback riding may be allowable in certain instances. Visitor use may be limited if resource conditions warrant special treatment.*

For field units contained in First-order Development and Visitor Use Zones:

*Visitors to this unit would include campers, picnickers, and others using the variety of facilities available in the unit. The number of visitors would vary by time of year but large numbers occur during popular high-use periods. Visitors would typically not use administrative areas.*

For field units contained in Second-order Development and Visitor Use Zones:

*Visitors to these zones would typically engage in camping, picnicking, fishing, wading, boating, and hunting in season using the unit as a base. The number of visitors would vary by time of year but large numbers occur during popular high-use periods.*

Each field unit has been assigned desired kinds and levels of visitor use, based on GMP Zone guidelines and specified desired resource condition assignments for each field unit. Although other visitor uses are possible, special consideration has been given to (1) car/RV camping; (2) tent camping; (3) packhorse camping; (4) hunting; (5) off-highway vehicle use. The following is not a comprehensive coverage of designations or restrictions and does not supersede language provided in Title 36 Code of Federal Regulations, Chapter 1. For additional explanation of designations, closures, request requirements, and other restrictions imposed under the discretionary authority of the National Area's Superintendent, consult the Compendium, on file at National Area Headquarters.

### ***2.3.1 Car or RV camping***

Pending completion of a Backcountry Management Plan, car and recreational vehicle camping is permitted in traditional-use camping areas along the sides of designated roadways and multiple-use trails (as designated in the Big South Fork Final General Management Plan). Car or RV camping is not permitted in portions of fields not directly accessible by designated roadways or trails.

### ***2.3.2 Tent camping***

Pending completion of a Backcountry Management Plan, general tent camping in fields by backpackers, hunters, and others is permitted unless units are designated closed for revegetation, rehabilitation, or other resource concerns. Camping is not permitted in designated Cultural Landscapes or in fields under agricultural lease.



### ***2.3.3 Packhorse camping***

Pending completion of a Backcountry Management Plan, packhorse camping is permitted in any field excluding designated Cultural Landscapes or those under agricultural lease. All park regulations concerning horse traffic and camping apply.

### ***2.3.4 Hunting***

Generally, hunting in fields is subject to the same regulations that apply to hunting throughout the park. Hunting, shooting, and loaded weapons are permitted in fields, except within designated safety zones. Thus, hunting is not allowed in certain fields (#1, 4.2, 15, 16.1, 16.2, 16.3, 17.1, 17.2, 17.3, 18.1, 18.2, 18.3, 18.4, 19, 20). All safety zones are conspicuously marked with paint and signs. Constructing permanent or semi-permanent tree stands in fields or on the margins of fields is also prohibited. For further explanation of hunting regulations, consult the annual Big South Fork NRRRA Hunting Guide and appropriate state regulations.

### ***2.3.5 Off-highway vehicle use***

Off-highway vehicle (OHV) use is permitted within the National Area on designated trails. This includes OHV use by hunters on multiple-use trails while actively hunting during big-game season. Where such trails bisect fields, OHVs are permitted; however, they are not allowed off of designated travel corridors. Thus, using an OHV to retrieve a deer or wild boar from a portion of a field not directly accessible by designated trail would be a violation of National Area policy.

## **3.0 IMPLEMENTATION**

Each field will be managed using one of three approaches: active restoration through direct treatments, passive restoration, or maintenance of current conditions. Fields targeted for restoration involve conversion from one vegetation type to some other desired condition. For example, converting an existing fescue field to NWSG or grassy woodland requires direct treatments such as chemical applications and/or prescribed fire. In contrast, converting a fescue field to a forest could be passively achieved through natural succession, provided that the site is excluded from further disturbance. Management actions under this passive approach would be restricted to periodic treatment of exotic plants. Other fields that are already in their desired condition (e.g., turfgrass, tall fescue mix) should require only maintenance treatments such as mowing or periodic bush-hogging.

Three main types of treatments will be used to establish and/or maintain desired field conditions: mechanical, chemical, and prescribed fire treatments. For each main treatment type, Tables 2-4 describe the specific treatments and treatment frequencies that will be used to establish and/or maintain the desired conditions of fields. For each field unit, Tables 5-10 present recommended treatment for years 1-5 and years 6-10 for each desired condition. Year 6-10 prescriptions are dependent on successful implementation of year 1-5 prescriptions. At the end of each 5-year prescription period, management effects should be closely evaluated and adapted as necessary to meet desired conditions. This plan does not look beyond a 10-year window and should be updated prior to year 10 in order to reflect progress made, lessons learned, changes in desired future conditions, changes to the Fire Management Plan, and changes in visitor needs or expectations.

### 3.1 Mechanical Vegetation Control

Chainsaws, brush-cutters, bush-hogs, farm equipment, and yard mowing equipment will be used at various frequencies to achieve and maintain desired conditions (Table 2). Often, mechanical treatments will be used in combination with chemical and/or prescribed fire treatments. Where turfgrass is already present and desired, yard mowing equipment (M1) will be used to maintain conditions to National Area standards (not addressed by this plan). Tall fescue fields and NWSG fields that cannot be burned must be bush-hogged periodically (M2/M3). For those NWSG units that cannot be burned, consideration might also be given to leasing to the public for hay. This application would be closely regulated and monitored to ensure no long-term loss of soil productivity or infestation of invasive plants. Because of the advanced woody-plant encroachment of several field units, intensive mechanical reduction using chainsaws and bush-hogs (M4) must be accomplished prior to implementing other treatments.

Additional mechanical treatments, such as disking, may be necessary to maintain the desired species composition of a field. For example, in fields converted to NWSG, a mixture of native forbs is desired to complement the grasses. Prescribed burning may favor grasses, allowing them to become dominant at the expense of forbs. Ground disturbances may create conditions favorable for forbs. A determination to use this treatment will be made on a case-by-case basis after a period of monitoring.

**Table 2. Mechanical treatments and treatment frequencies.**

<b>Treatment Code</b>	<b>Treatment</b>	<b>Frequency</b>
M1	Mow	seasonal
M2	Bush-hog/graze	12 months
M3	Bush-hog	24-60 months
M4	Intensive chainsaw/bush-hog	1-time application
M5	Plant/harvest	seasonal

### 3.2 Prescribed Fire

Prescribed fire will be used at various return intervals to reduce undesirable woody vegetation, alter species composition, and create or maintain open conditions (Table 3). Intensive use of fire on a 12-24 month frequency (F1) will be used to demonstrate intensive fire effects on selected sandstone glade habitat and NWSG management. An example is the Newtie King field, which contains sandstone glades in marginal condition because of previous disturbance and advanced encroachment by woody vegetation. A high fire frequency will help eliminate undesirable woody vegetation and restore the site to an open grassy setting. Most other NWSG units, particularly those in which the desired vegetation condition is grasses with little or no woody vegetation will be burned during the spring or fall approximately every three years (F2). Spring burns are preferred for NWSG units so that winter cover will be available for wildlife. Grassy woodlands or NWSG units where a more established shrub component is desirable or acceptable will be burned every 4-5 years (F3). Forest units may be periodically burned (F4) when they are nested within larger Prescribed Fire Treatment Areas, as described in the National Area's Fire Management Plan (2004). Prescribed burn frequencies may be altered as needed to meet desired vegetation condition objectives for any given unit.

**Table 3. Prescribed fire treatments and treatment frequencies.**

<b>Treatment Code</b>	<b>Treatment</b>	<b>Treatment Frequency</b>
F1	Spring burn	12-24 months
F2	Spring burn	36 months
F3	Spring or fall burn	48-60 months
F4	Spring or fall burn	> 60 months

### **3.3 Exotic Vegetation Control**

To achieve or maintain desired conditions in most fields, herbicides will be the primary tool used to control exotic plant infestations. Spot treatments of herbicides applied at labeled rates and various frequencies can be used to control most exotic plant infestations. (Table 4; E1-4). Exotic vegetation control spot treatment methods will include directed basal bark spray, foliar spray, cut-stump spray, and direct injection. Herbicides that are most likely to be used for spot treatments are triclopyr, imazapyr, and glyphosate. For converting fescue fields to NWSG, broadcast treatments of products containing imazapic and glyphosate herbicides will be required (E5).

Basal bark treatments -low volume or streamline applications of a herbicide such as ester formulations of triclopyr to the lower 30cm of target stem bark - can be used to selectively control saplings and large shrubs < 10 cm basal diameter. Complete control of foliage, stems, and roots is possible, although some target species may resprout and require a follow-up treatment. Directed spray with a viscous oil carrier minimizes overspray and drift. Making no applications within 100 m of seeps, streams, or other water sources will prevent impacts to aquatic resources.

Using backpack sprayers, foliar applications of products containing salt formulations of triclopyr or glyphosate is an effective and rapid technique for controlling large infestations of certain herbaceous and woody species. These formulations are labeled for use near water; however, to avoid water contact from drift, no foliar applications will be made within 10 m of seeps, streams, or other water sources. If foliar application is required within 10 m of water, herbicides will be brushed, sponged, or wiped onto foliage.

Cut-stump treatment is an effective method of control that minimizes the potential to affect non-target plants. The target plant is cut close to ground level and the exposed stump is immediately treated with herbicide mixed in water. We intend to apply salt formulations of triclopyr or glyphosate in water with backpack sprayers or hand spray bottles. Dormant season application is possible as long as the ground is not frozen. This method will be used for many shrubs and some tree saplings.

Herbicides (such as glyphosate or salt formulations of triclopyr) can also be injected directly into tree cambium wounds created with a hatchet or other cutting tool. Injections are made at 10-cm intervals all the way around the tree bole, typically in the lower 1 m. This method is recommended for any time of year, but is particularly effective while some species (such as tree-of-heaven, mimosa, and Paulownia) are actively growing.

**Table 4. Exotic plant control treatments and treatment frequencies.**

<b>Treatment Code</b>	<b>Treatment</b>	<b>Frequency</b>
E1	Spot treatment	1-6 months
E2	Spot treatment	12 months
E3	Spot treatment	12-24 months
E4	Spot treatment	24+ months
E5	Intensive conversion	1-time application

### **3.4 NWSG Establishment**

To convert fescue dominated fields to NWSG, we will use established protocols that involve a combination of prescribed fire plus imazapic/glyphosate herbicide application or bush-hogging plus imazapic/glyphosate. Because many of the National Area's fields contain a component of NWSG and native forbs, we will initially defer planting seeds; instead, we will attempt to release existing NWSG and forbs using prescribed fire and herbicide applications. For fields which currently do not have a substantial amount of native grass, native warm-season grasses will be planted from seed. Local or regional ecotype seeds will be purchased from commercial sources and collected from within the National Area and/or adjacent areas. Following fescue eradication, seeds will be planted using tractor-driven no-till drills designed for NWSG or, in a minority of cases, through conventional tillage practices.

Logistic and financial constraints may delay implementation of NWSG establishment in some field units. Intermediate treatments will be needed to maintain those units that cannot be converted within the first one or two years. The primary treatment will be bush-hogging; however, chemical treatments or intermediate plantings may also be used. Intermediate plantings involve disking a field and planting a plant cover crop to help suppress tall fescue growth and retard succession to forest. Traditional cover crops include winter wheat and clover.

### **3.5 Partnerships**

Portions of the National Area in Kentucky are managed cooperatively with the Kentucky Fish & Wildlife Agency per Memorandum of Understanding. A similar Memorandum of Understanding exists between the National Area and the Tennessee Wildlife Resources Agency. These agreements clarify the role of each agency in cooperatively managing the plant and animal resources of the National Area. Upon completion of this plan, NPS hopes to extend this partnership to include technical and material assistance in managing the National Area's fields.

### **3.6 Activity Schedule**

Pending completion of the internal and public review of the Plan and associated Environmental Assessment (EA), implementation of the proposed actions is anticipated to begin in spring 2006. Work should begin first on high priority units, based on their high biological, cultural, or recreational value. Management priority is categorized for each field unit in Tables 5-10. Because no changes are proposed to the ongoing maintenance of turfgrass sites, they were not assigned a management priority.

### **3.7 Environmental Compliance**

In 2004, a Public Scoping Document was released to gather public input on a general proposal to manage the National Area's fields. The current Plan is, in part, a reflection of that process. An Environmental Assessment (EA) has since been prepared to accompany the current Plan and satisfy National Environmental Policy Act (NEPA) requirements. When public scoping of the Plan and EA are complete, the Superintendent will make a determination of the need for additional NEPA compliance. Compliance with the Endangered Species Act will be initiated through consultation with the appropriate field offices of U.S. Fish & Wildlife Service.